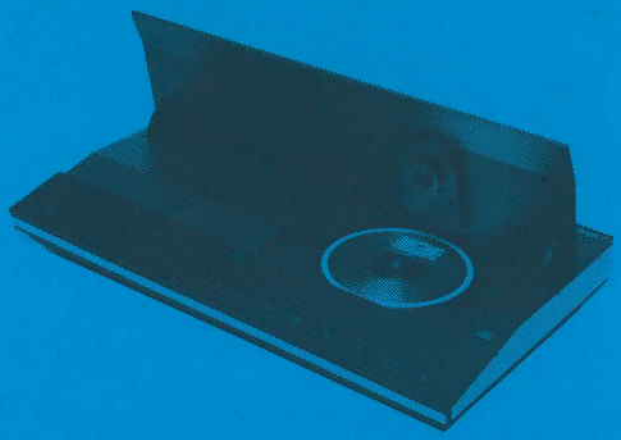
Bang & Olufsen



Beogram CD 4500

Type 5171, 5172, 5173, 5174, 5175

BEOGRAM CD 3500

Type 5146-5147-5148-5149-5150

CD-Mechanism Version II
Beogram CD 4500

SERVICEANVISNING
SERVICE MANUAL

Modules

3 Display ..... diagr. C page 2-5

5 Decoder ..... diagr. B page 2-4

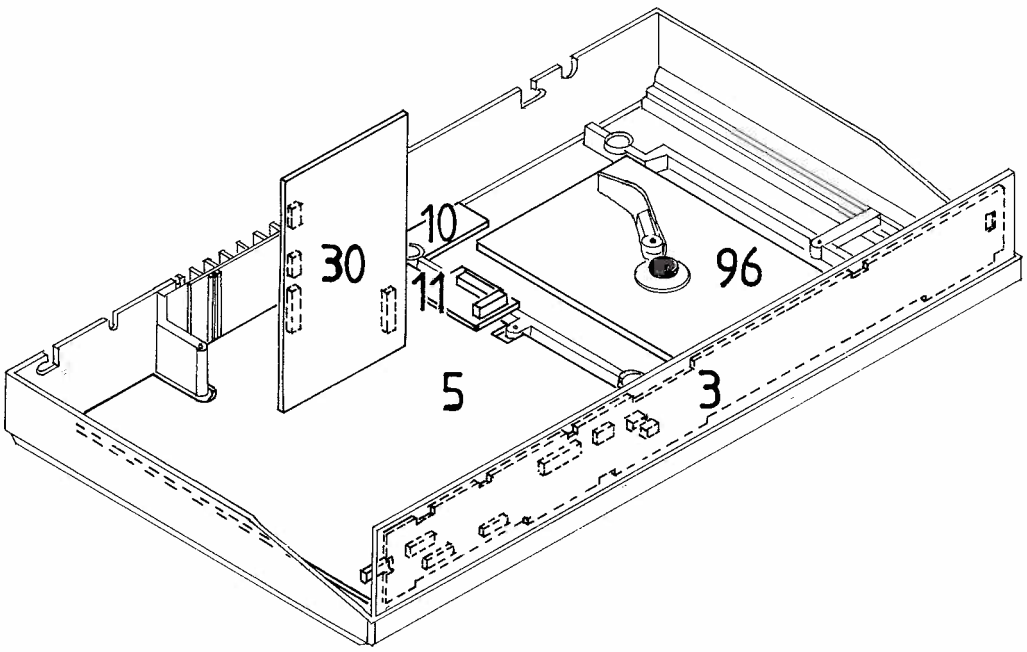
10 Digital out ..... diagr. B page 2-4

11 Connections PCB ..... diagr. A page 2-2

30 Servo ..... diagr. A page 2-2

96 CD-mechanism ..... diagr. A page 2-2

CLASS 1
LASER PRODUCT



Bang & Olufsen

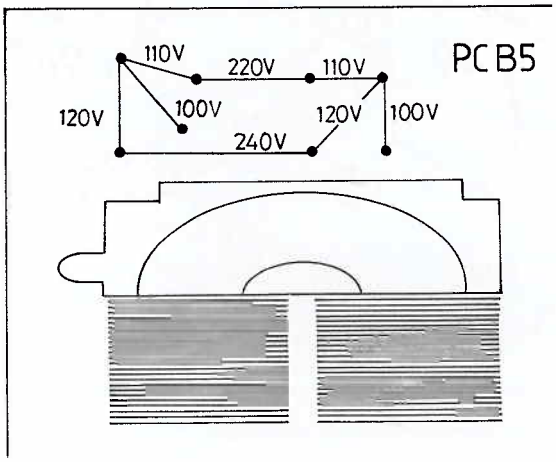
TECHNICAL SPECIFICATIONS

Frequency range	3-20,000 Hz ±0.3 dB
Signal-to-noise ratio	>100 dB/110 dB A-weighted
Dynamic range	>96 dB
Harmonic distortion	<0.0025% at 0 dB
	<0.025% at -20 dB
Channel separation	>101 dB
Channel difference	<0.08 dB
Converter system	2 x 16 bit, 4 x oversampling 176.4 kHz
Low pass filter	Digital + Bessel/elliptical analog
Damping >20,000 Hz	>50 dB
Phase error between L and R	0 degree at 20-20,000 Hz
Output, analog	1.3 V RMS at 0 dB
Output, digital	For digital equipment
Power supply	Type no. 5171: 220 V
	Type no. 5172: 240 V
	Type no. 5173: 120 V
	Type no. 5174: 100 V
	Type no. 5175: 240 V
Power frequency	50-60 Hz
Power consumption	23 watts
Dimensions W x H x D	42 x 7 x 24.5 cm (16½" x 2¾" x 9½")
Weight	4.5 kg (9,9 lbs)

Subject to change without notice

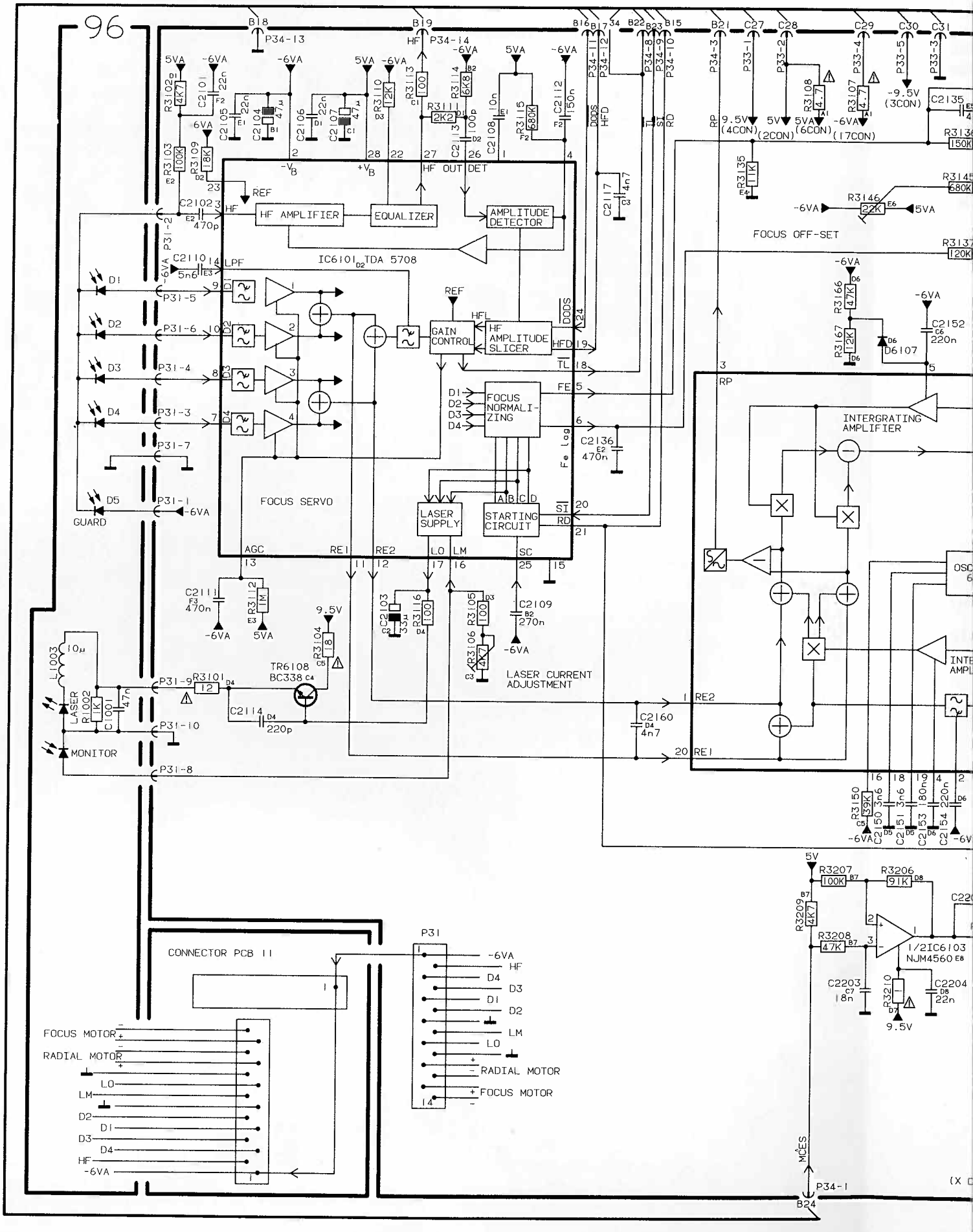
OVERSIGT OVER LEDNINGSMONTERING FOR NETTRANSFORMATOR

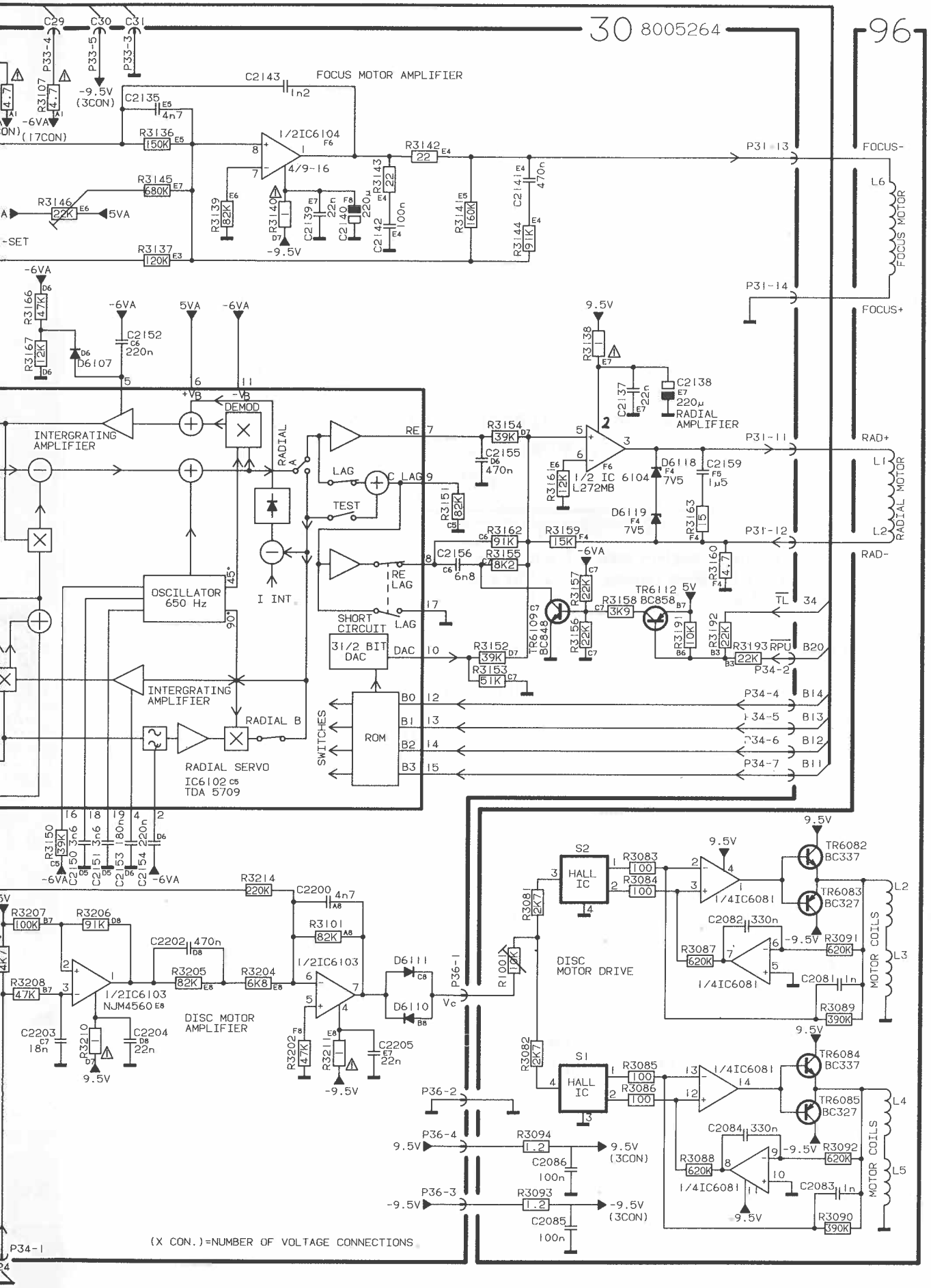
SURVEY OF WIRE MOUNTING FOR MAINS TRANSFORMER



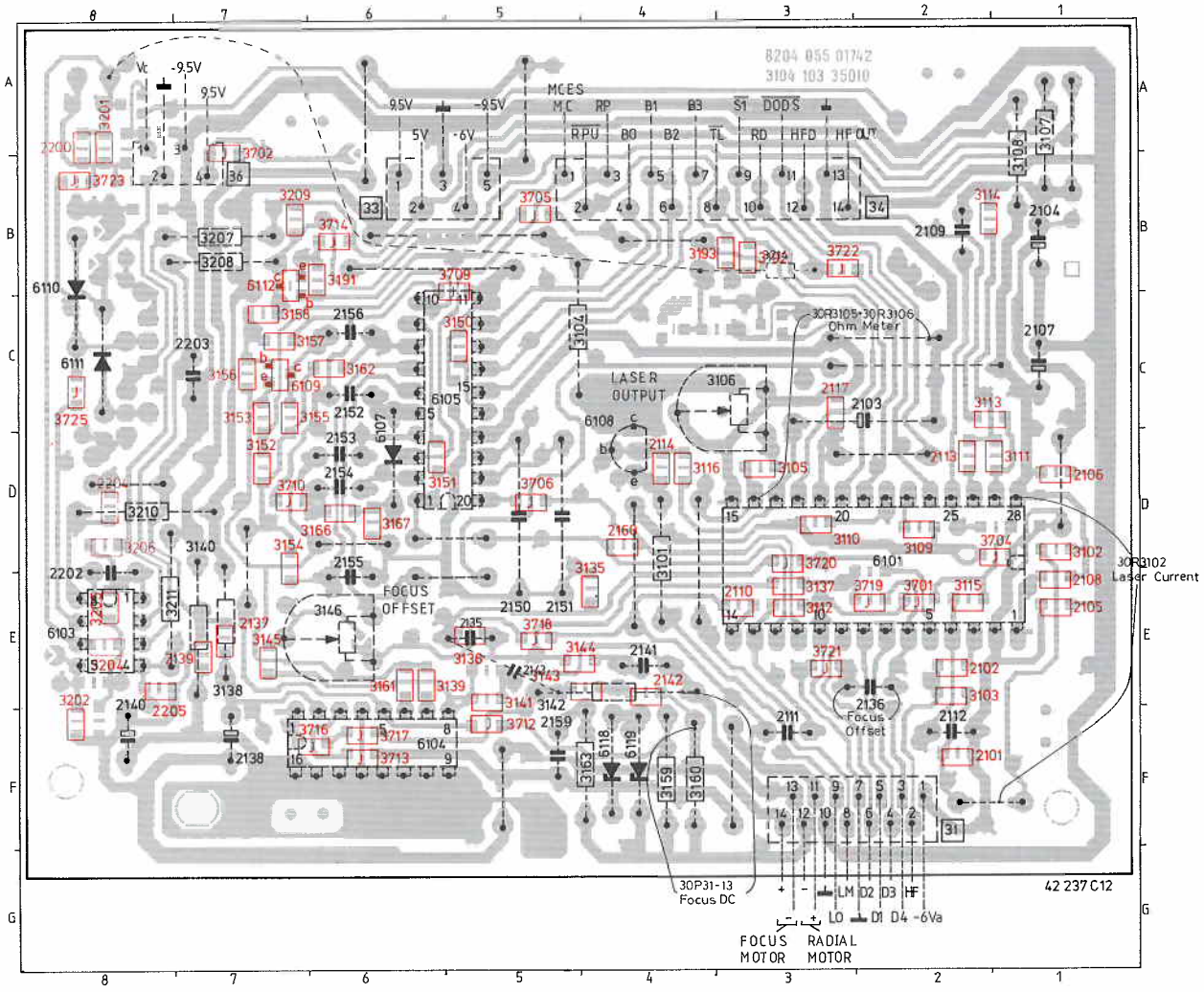
2-2

DIAGRAM A (Servo and Disc Motor System)

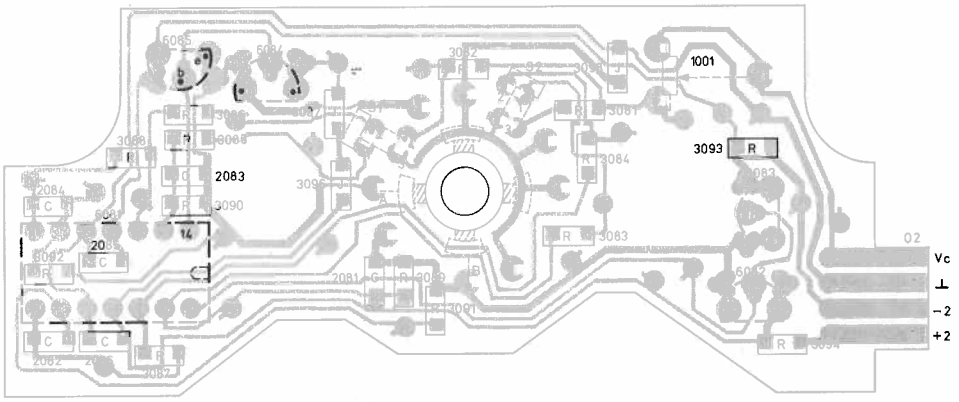



30 8005264
96
FOCUS MOTOR AMPLIFIER
FOCUS-
FOCUS+
FOCUS MOTOR
RADIAL AMPLIFIER
RAD+
RAD-
RADIAL MOTOR
INTERGRATING AMPLIFIER
DEMOD
RADIAL
LAG
TEST
RE LAG
SHORT CIRCUIT
OSCILLATOR 650 Hz
I INT
31/2 BIT DAC
ROM
SWITCHES
RADIAL SERVO
IC6102 C5
TDA 5709
DISC MOTOR AMPLIFIER
NJM4560 E8
DISC MOTOR DRIVE
HALL IC
MOTOR COILS
(X CON.)=NUMBER OF VOLTAGE CONNECTIONS

SERVO PCB30

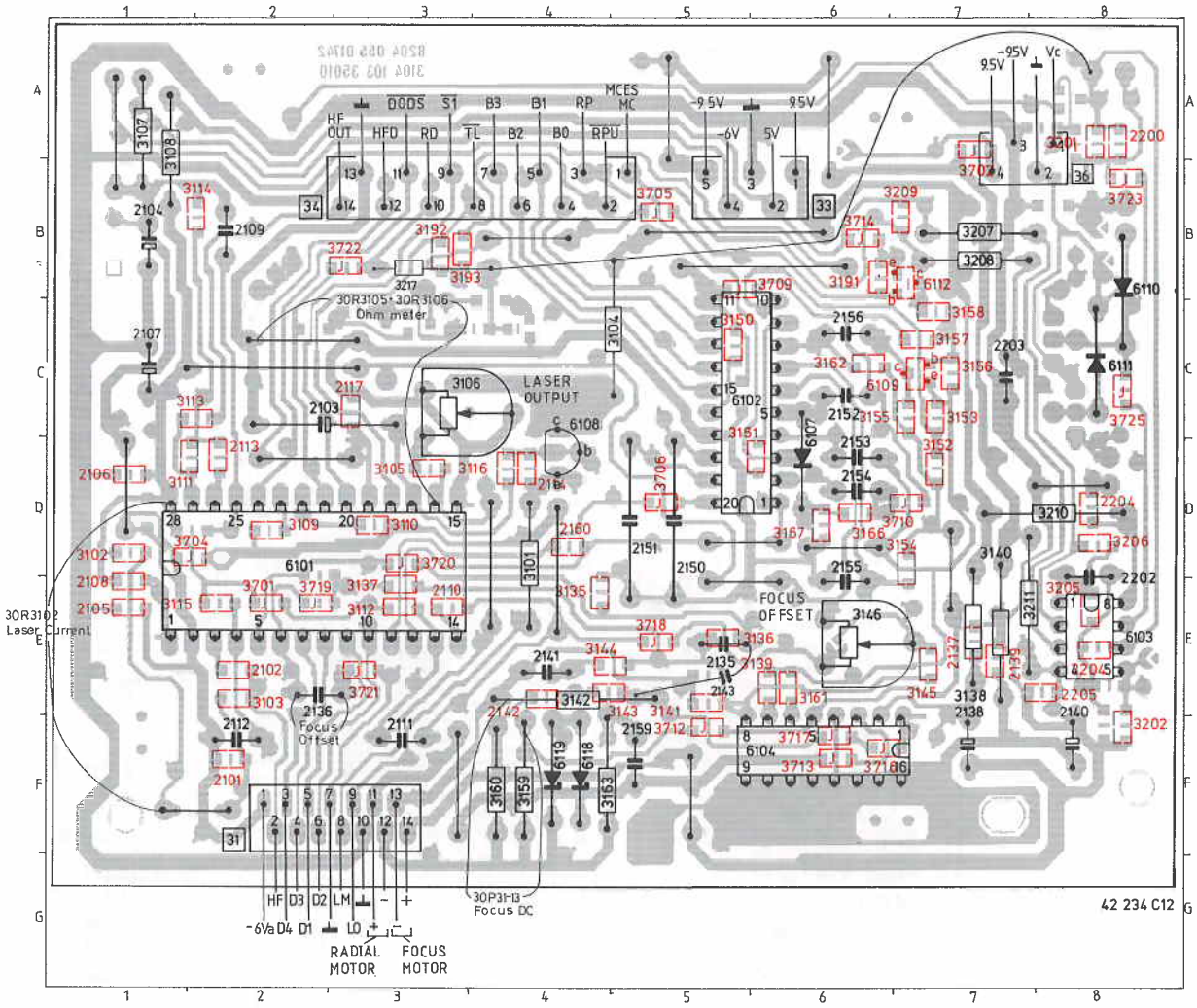


DISC MOTOR CONTROL

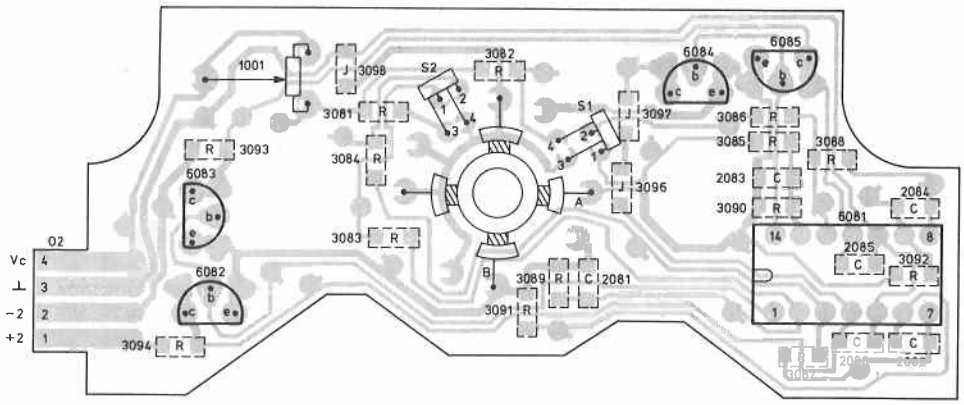


2-3

SERVO PCB30

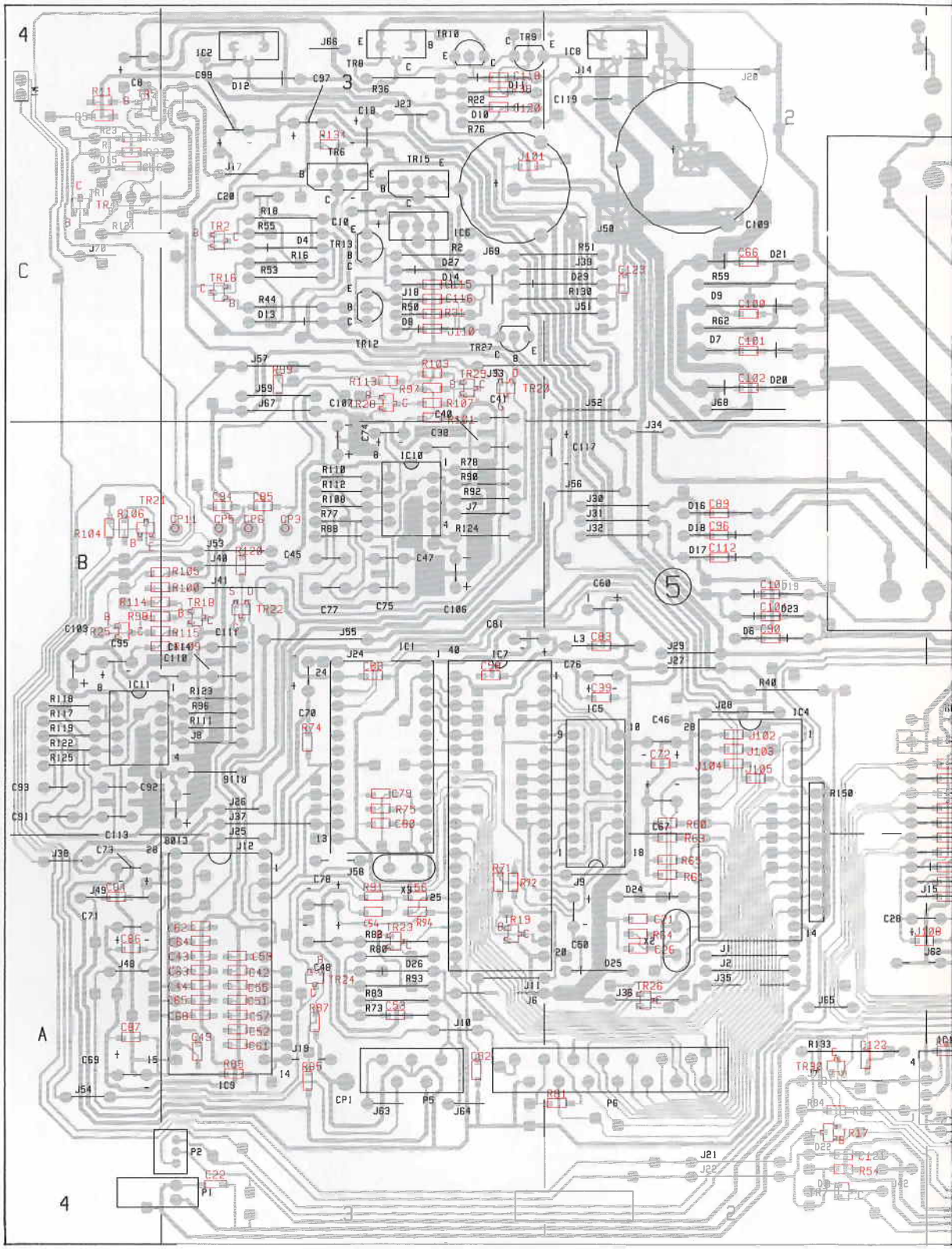


DISC MOTOR CONTROL

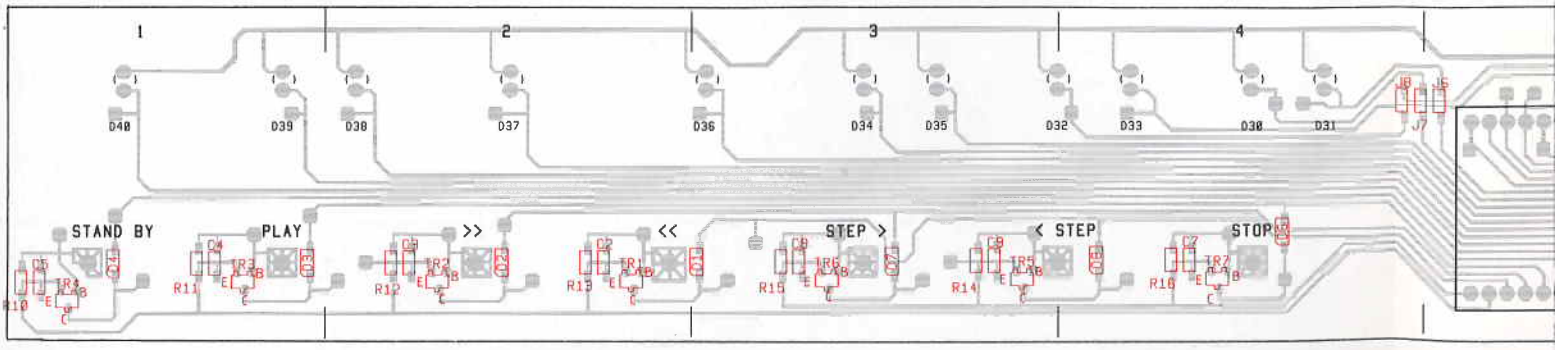


2-4 2-

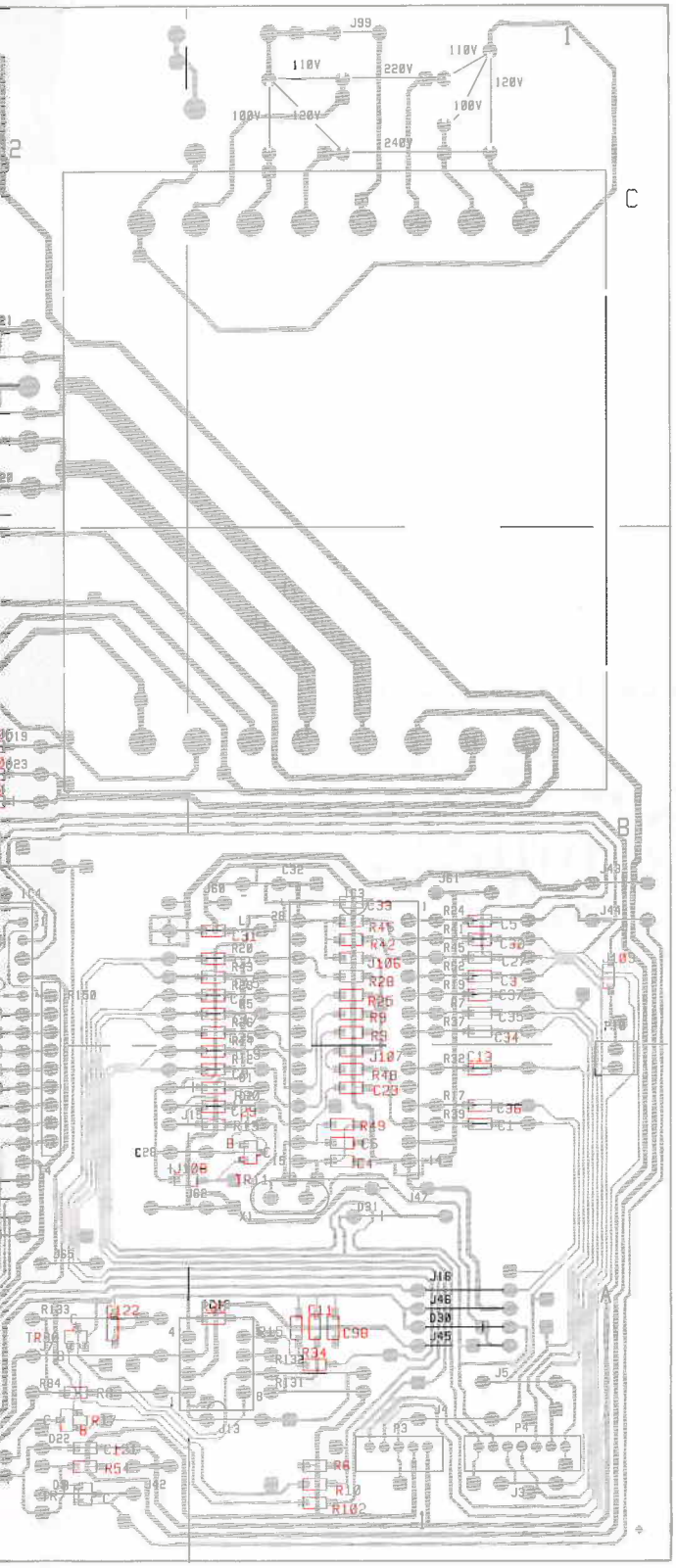
DECODER PCB5



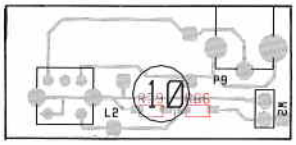
DISPLAY PCB3



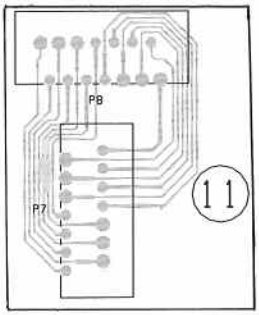
Bang & Olufsen

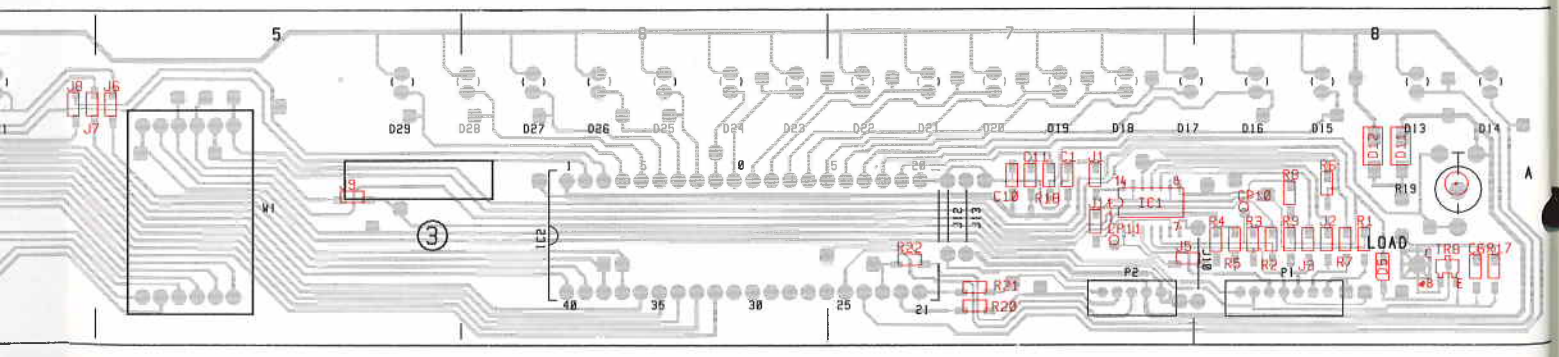


DIGITAL OUT PCB 10



CONNECTION PCB 11





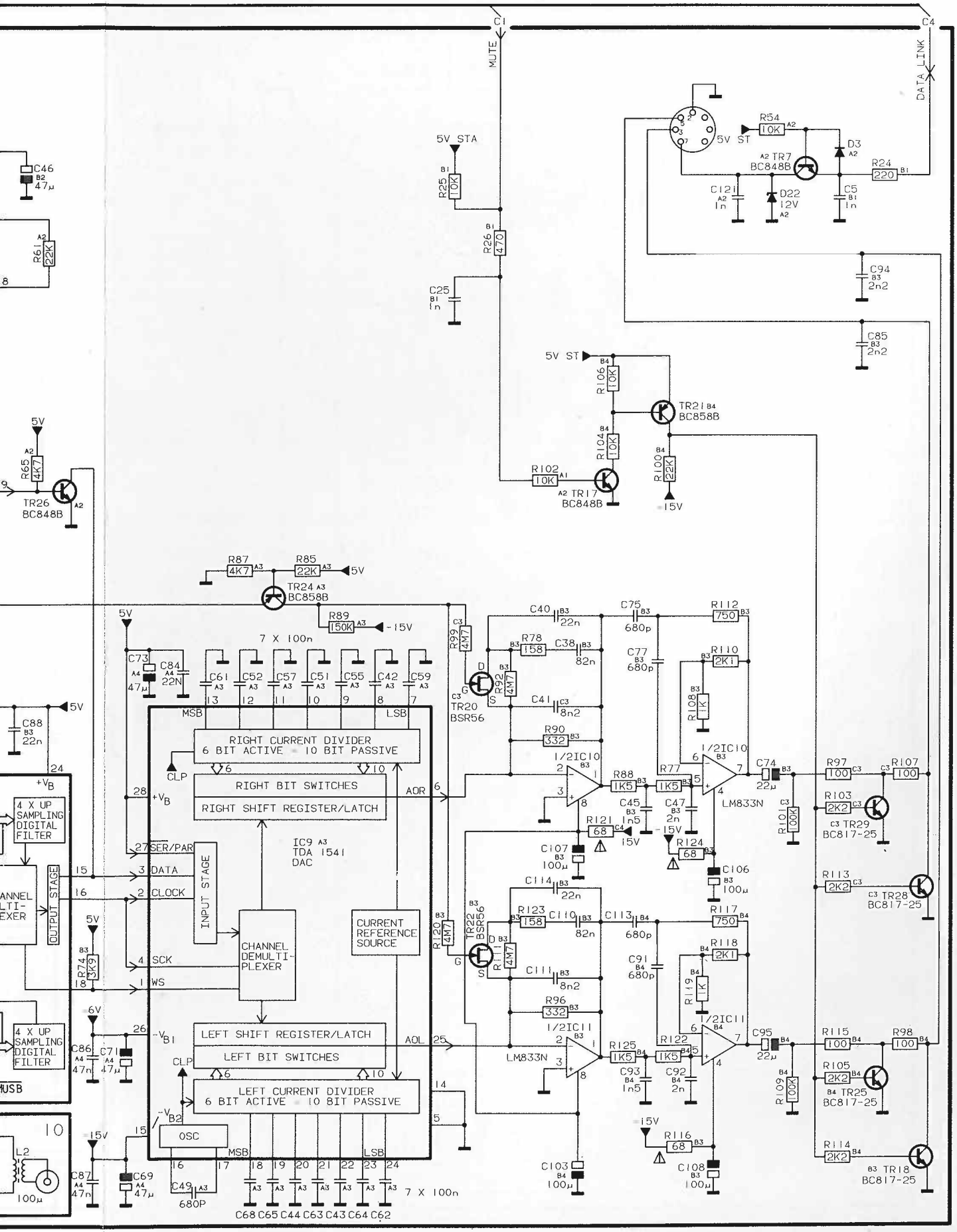
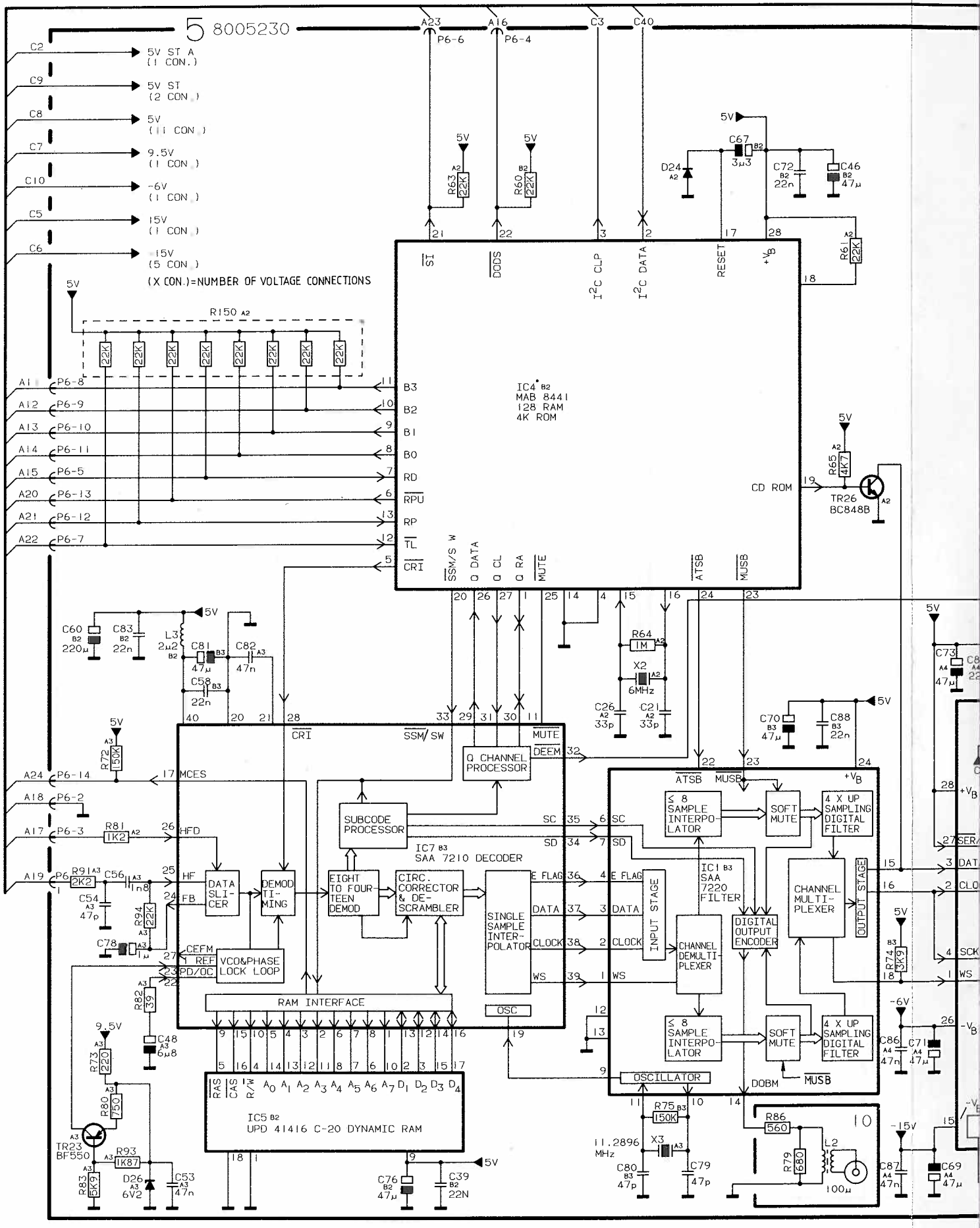
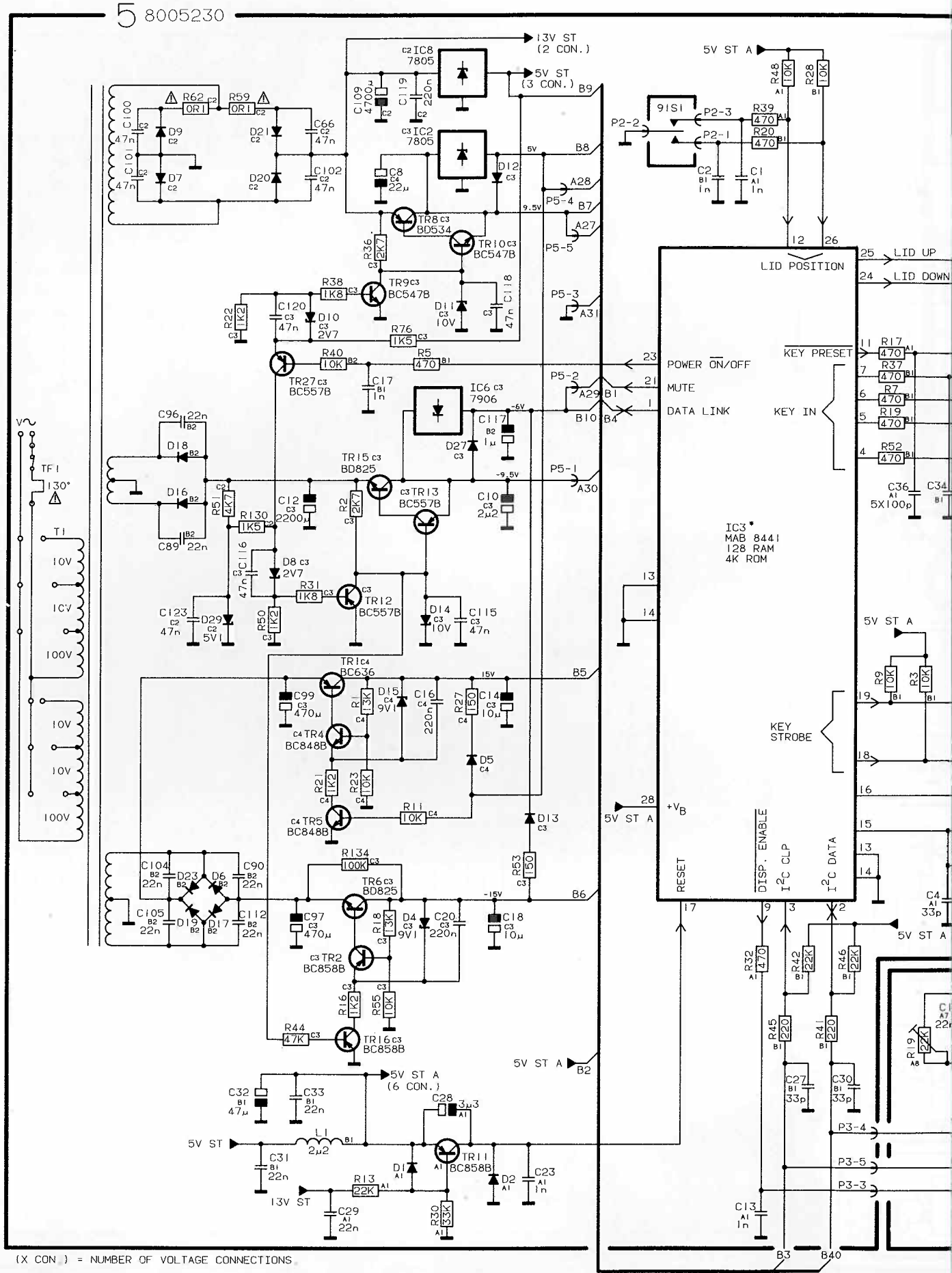

C1
MUTE
C4
DATA LINK
5V STA
R25 10K
R26 470
C25 In
R54 10K
5V ST
TR7 BC848B
D3
R24 220
C121 In
D22 12V
C5 In
C94 2n2
C85 2n2
5V ST
R106 10K
TR21 BC858B
R104 10K
R100 22K
R102 10K
TR17 BC848B
-15V
C46 47µ
R61 22K
R65 4K7
TR26 BC848B
5V
R87 4K7
R85 22K
TR24 BC858B
R89 150K
-15V
7 X 100n
C73 47µ
C84 22N
C61 C52 C57 C51 C55 C42 C59
MSB
LSB
RIGHT CURRENT DIVIDER
6 BIT ACTIVE - 10 BIT PASSIVE
RIGHT BIT SWITCHES
RIGHT SHIFT REGISTER/LATCH
CLP
AOR
IC9
TDA 1541
DAC
SER/PAR
DATA
CLOCK
SCK
WS
INPUT STAGE
OUTPUT STAGE
CHANNEL DEMULTI-PLEXER
CURRENT REFERENCE SOURCE
LEFT SHIFT REGISTER/LATCH
LEFT BIT SWITCHES
LEFT CURRENT DIVIDER
6 BIT ACTIVE - 10 BIT PASSIVE
AOL
OSC
C88 22n
4 X UP SAMPLING DIGITAL FILTER
R74 3K9
C86 47n
C71 47µ
C87 47n
C69 47µ
C49 680P
C68 C65 C44 C63 C43 C64 C62
7 X 100n
C40 22n
C75 680p
R112 750
R78 158
C38 82n
C77 680p
R110 2K1
R108 1K
R99 4M7
R92 4M7
TR20 BSR56
C41 8n2
R90 332
1/2IC10
R88 1K5
R77 1K5
C74 22µ
LM833N
C45 1n5
C47 2n
R121 68
R124 68
C107 100µ
C106 100µ
R97 100
R107 100
R103 2K2
TR29 BC817-25
R101 100K
R113 2K2
TR28 BC817-25
C114 22n
R123 158
C110 82n
C113 680p
R117 750
R120 4M7
TR22 BSR56
R111 4M7
C111 8n2
C91 680p
R118 2K1
R119 1K
R96 332
1/2IC11
R125 1K5
R122 1K5
C95 22µ
LM833N
C93 1n5
C92 2n
R109 100K
R115 100
R98 100
R105 2K2
TR25 BC817-25
R116 68
C108 100µ
C103 100µ
R114 2K2
TR18 BC817-25

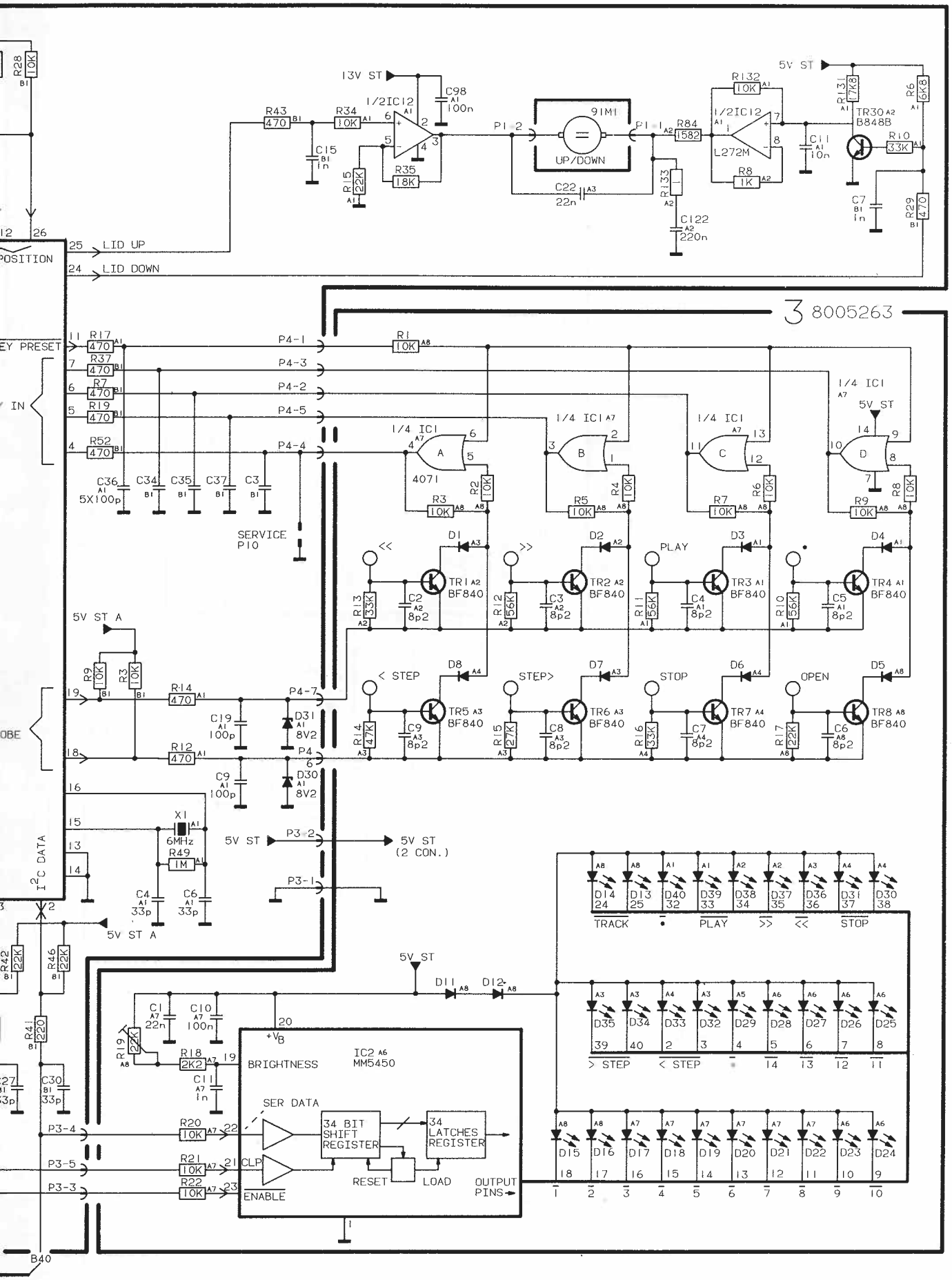
DIAGRAM B (Decoder)

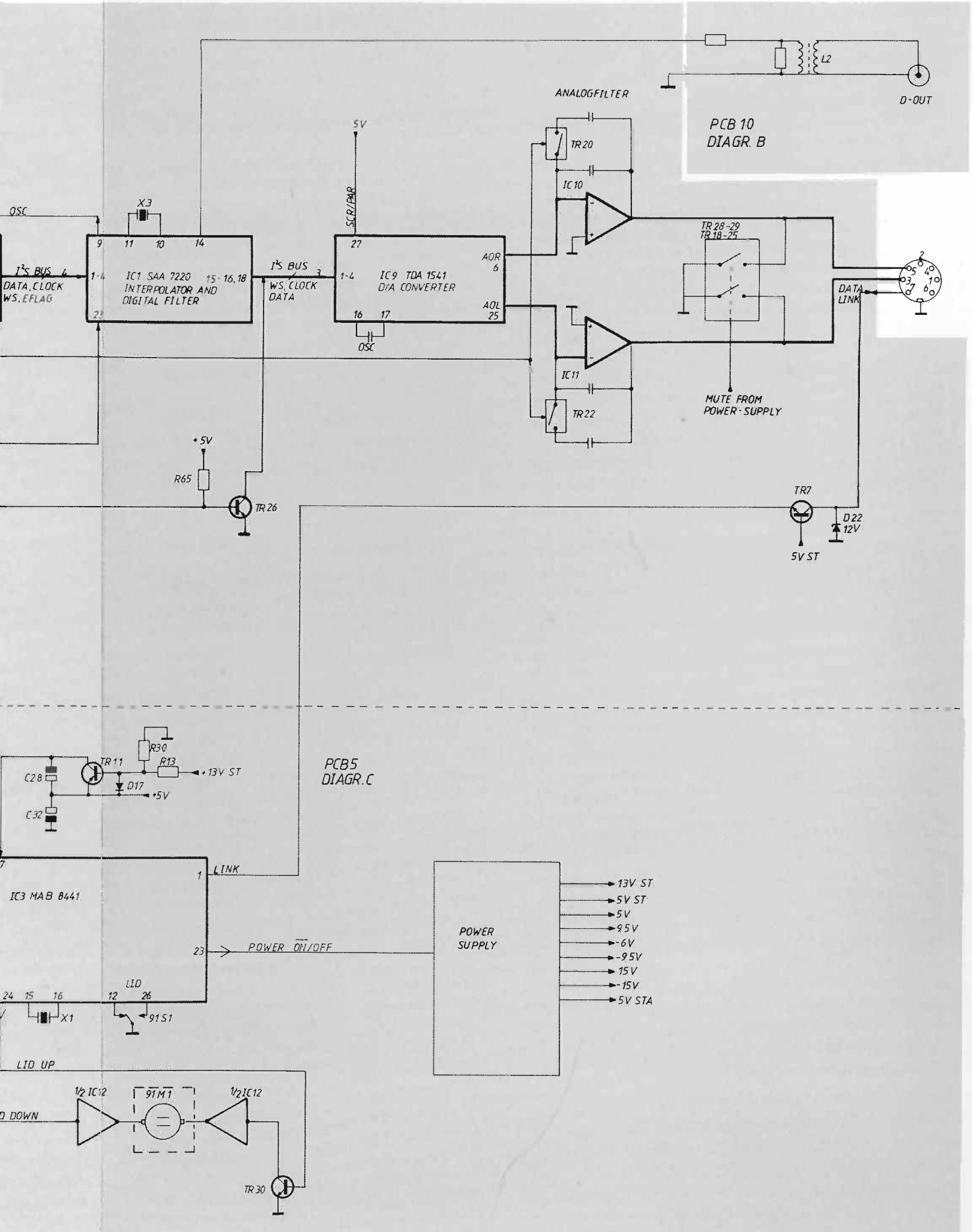


2-6 2-

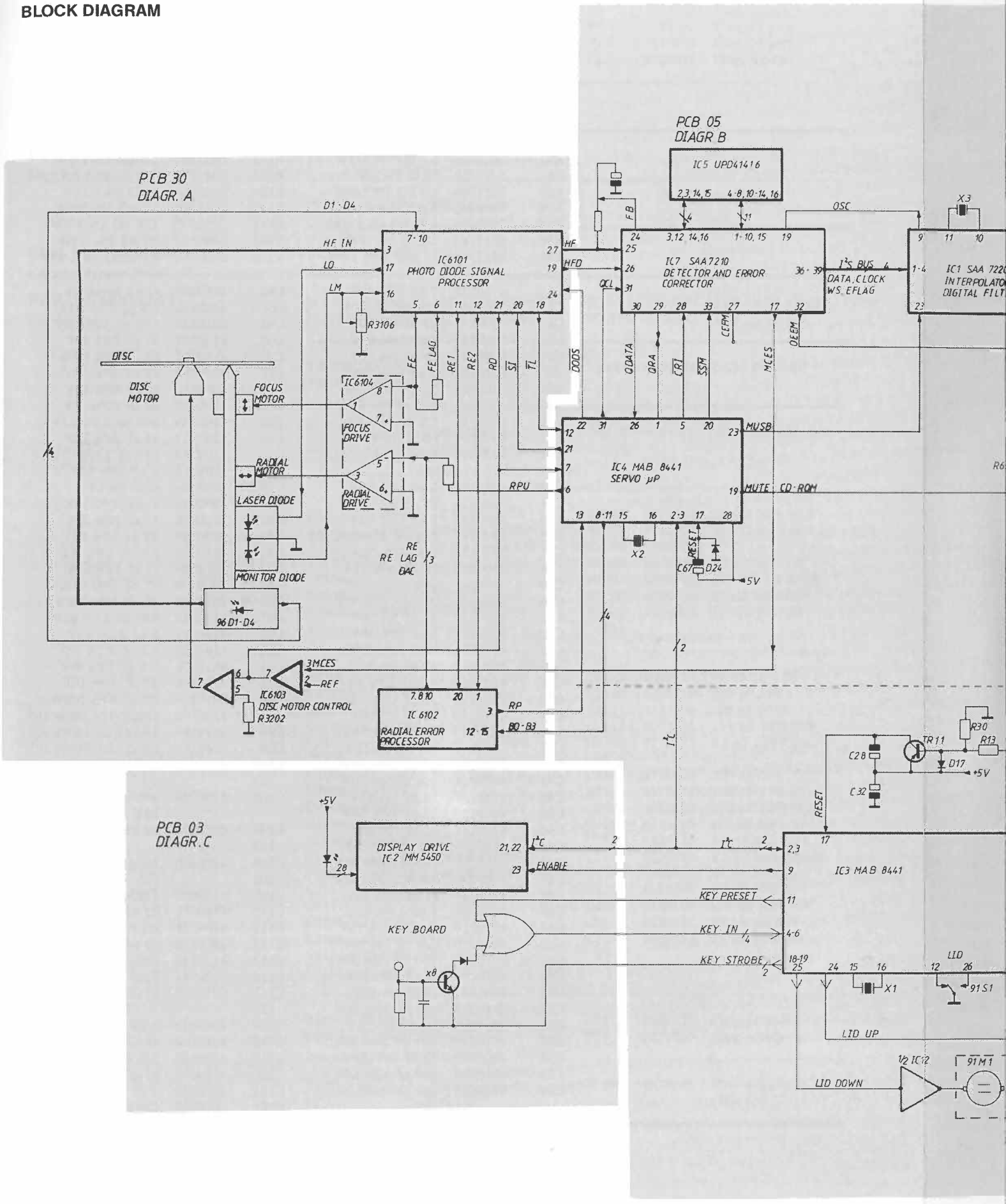
DIAGRAM C (Power Supply, Control and Display)




3 8005263
13V ST
5V ST
I/2IC12
R43 470
R34 10K
C98 100n
C15 in
R5 22K
R35 18K
P1-2
91M1
UP/DOWN
P1-1
R84 1582
C22 22n
R133
C122 220n
R132 10K
L272M
R8 1K
C11 10n
TR30 B848B
R10 33K
R131 7K8
R6 6K8
C7 in
R29 470
25 LID UP
24 LID DOWN
POSITION
EY PRESET
IN
OBE
R17 470
R37 470
R7 470
R19 470
R52 470
P4-1
P4-3
P4-2
P4-5
P4-4
R1 10K
1/4 IC1
4071
R2 10K
R3 10K
R4 10K
R5 10K
R6 10K
R7 10K
R8 10K
R9 10K
C36 5X100p
C34
C35
C37
C3
SERVICE P10
D1
D2
D3
D4
TR1 BF840
TR2 BF840
TR3 BF840
TR4 BF840
R13 33K
R12 56K
R11 56K
R10 56K
C2 8p2
C3 8p2
C4 8p2
C5 8p2
<<
>>
PLAY
5V ST A
R14 470
R12 470
P4-7
P4-6
C19 100p
C9 100p
D31 8V2
D30 8V2
D8
D7
D6
D5
TR5 BF840
TR6 BF840
TR7 BF840
TR8 BF840
R14 47K
R15 27K
R16 33K
R17 22K
C9 8p2
C8 8p2
C7 8p2
C6 8p2
< STEP
STEP>
STOP
OPEN
X1 6MHz
R49 1M
C4 33p
C6 33p
P3-2
P3-1
5V ST (2 CON.)
I2C DATA
R42 22K
R46 22K
R41 220
C27 33p
C30 33p
D11
D12
C1 22n
C10 100n
R19 22K
R18 2K2
C11 in
20 +VB
BRIGHTNESS
IC2 MM5450
SER DATA
34 BIT SHIFT REGISTER
34 LATCHES REGISTER
RESET
LOAD
OUTPUT PINS
CLP
ENABLE
R20 10K
R21 10K
R22 10K
P3-4
P3-5
P3-3
D14 24
D13 25
D40 32
D39 33
D38 34
D37 35
D36 36
D31 37
D30 38
TRACK
PLAY
>>
<<
STOP
D35 39
D34 40
D33 2
D32 3
D29 4
D28 5
D27 6
D26 7
D25 8
> STEP
< STEP
D15 18
D16 17
D17 16
D18 15
D19 14
D20 13
D21 12
D22 11
D23 10
D24 9
B40

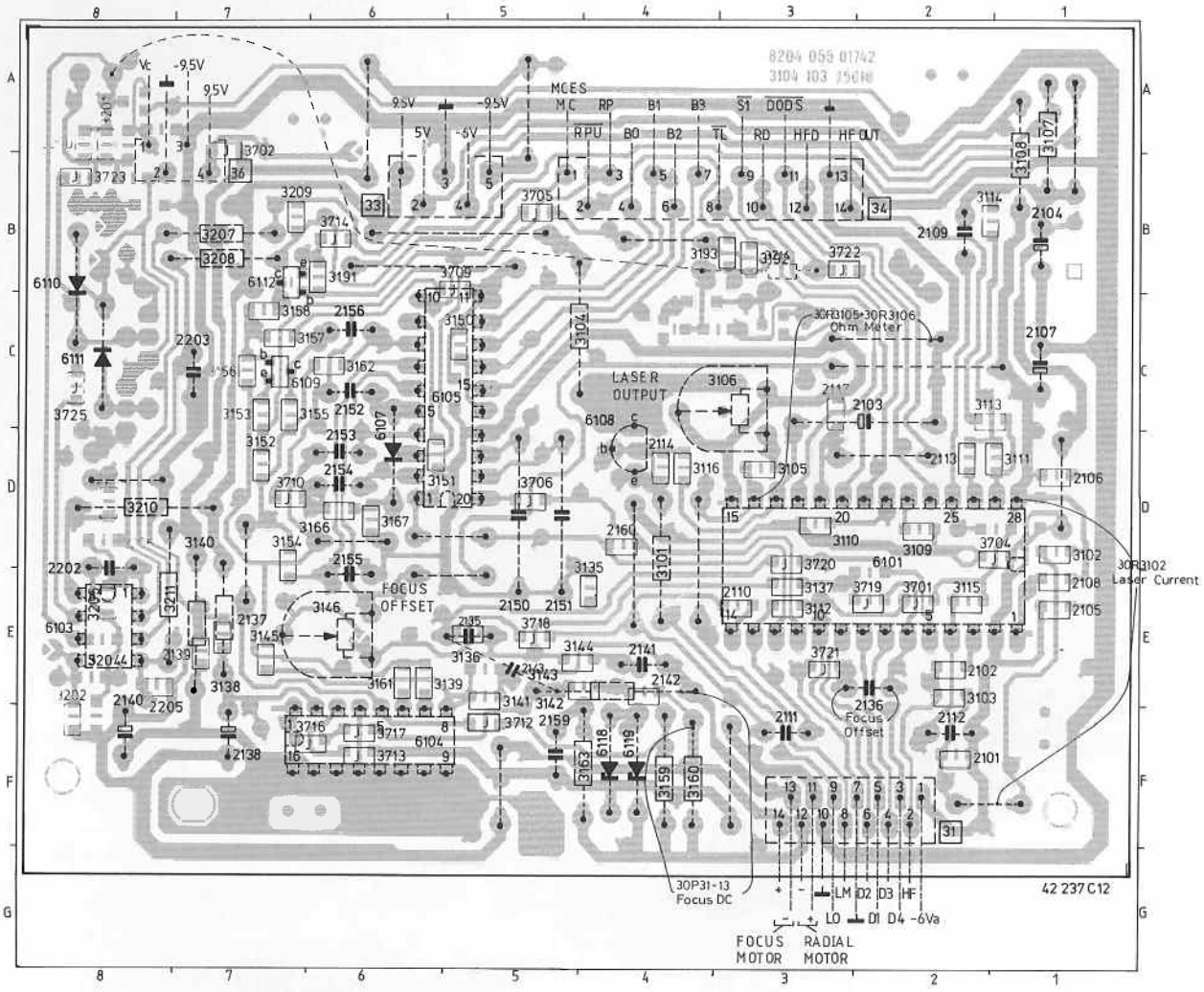

L2
D-OUT
PCB 10
DIAGR. B
ANALOGFILTER
5V
TR20
IC10
SCR/BAR
OSC
X3
I²S BUS
DATA, CLOCK
WS, EFLAG
IC1 SAA 7220
INTERPOLATOR AND
DIGITAL FILTER
I²S BUS
WS, CLOCK
DATA
IC9 TDA 1541
D/A CONVERTER
AOR
AOL
TR28-29
TR18-25
DATA
LINK
IC11
TR22
MUTE FROM
POWER-SUPPLY
+5V
R65
TR26
TR7
D22
12V
5V ST
PCB5
DIAGR.C
R30
TR11
R13
+13V ST
C28
D17
+5V
C32
IC3 MAB 8441
LINK
POWER ON/OFF
LID
X1
91S1
LID UP
1/2 IC12
91M1
1/2 IC12
TR30
POWER
SUPPLY
13V ST
5V ST
5V
9.5V
-6V
-9.5V
15V
-15V
5V STA

BLOCK DIAGRAM



5-1

SERVO PCB30



JUSTERINGER

Laserstrøm

Vigtigt:
Efter udskiftning af CD løbeværket eller servo-PCB30 skal laserstrøm-potentiometeret 30R3106 forjusteres, inden apparatet tilsluttes lysnettet.

Tilslut et ohmmeter over 30R3105 + 30R3106. Juster 30R3106, indtil 30R3105 og 30R3106 tilsammen har en værdi på 1 kohm.

Tilslut et DC-voltmeter over 30R3102.

Tilslut et oscilloskop til ben 27 på 30IC6101.

Ilæg testplade nr. 5 (plade uden fejl, bestillingsnr. 3634031) og tryk PLAY.

Kontroller på oscilloskopet, om der er HF signal. Hvis der ikke er HF signal, slukkes apparatet, og fejlen findes.

Hvis der er HF signal, spilles spor 1 på testplade 5, og 30R3106 justeres, til der måles 50mV ±5mV med DC-voltmeteret.

Fokus offset.

Ilæg testplade nr. 5A (bestillingsnr. 3634031).

Sæt apparatet i service-position 2 ved at kortslutte service-stikket på PCB5 samtidig med, at netstikket sættes i.
Kortslutningen på service-stikket fjernes.

Tryk STEP> 2 gange.

Hvis »2« i displayet bliver ved med at blinke, justeres 30R3146, indtil »2« lyser konstant.

Sæt apparatet i serviceposition 4 ved at trykke STEP> 2 gange (»4« i displayet skal lyse, og pladen skal rotere).

Tilslut et DC-voltmeter over 30C2136.

Juster 30R3146, indtil der måles 400 mV ±40 mV.

Vinkel-indstilling på laserarm

Før justeringen skal vinkel-indstillingen på laser-armen kontrolleres, se side 7.1.

Hvis kontrol af vinkel-indstillingen viser, at vinklen er uden for tolerance, skal den *ikke* justeres til minimum afvigelse men blot justeres inden for tolerance.

Efter justering af vinkel-indstillingen skal laser-armens friktion kontrolleres. Dette kan gøres med en trykfjedermåler, som holdes mod magneten på fokusenheden.

ADJUSTMENTS

Laser current

Important:
When replacing the CD mechanism or the servo PCB30, the laser current potentiometer 30R3106 must be preadjusted before the set is connected to mains.

Connect an ohmmeter across 30R3105 + 30R3106. Adjust 30R3106 until the combined value of 30R3105 and 30R3106 is 1 kohm.

Connect a DC voltmeter across 30R3102.

Connect an oscilloscope to pin 27 of 30IC6101.

Load test disc no. 5 (disc without faults, part no. 3634031) and press PLAY.

Check on the oscilloscope whether there is any HF signal. If not, switch off the CD player and locate the fault.

If there is an HF signal, play track 1 of test disc 5 and adjust 30R3106 until a reading of 50 mV ±5 mV is obtained on the DC voltmeter.

Focus offset

Load test disc 5A (part no. 3634031)

Set the unit in service position 2 by short-circuiting the service plug on PCB5 and simultaneously connecting the player to mains. Remove the short-circuit on the service plug.

Press STEP> twice.

If '2' in the display keeps flashing, adjust 30R3146 until '2' is lit constantly.

Set the unit in service position 4 by pressing STEP> twice ('4' in the display must be lit and the disc rotate).

Connect a DC voltmeter across 30C2136.

Adjust 30R3146 until a reading of 400 mV +/- 40 mV is obtained.

Angle setting of laser arm

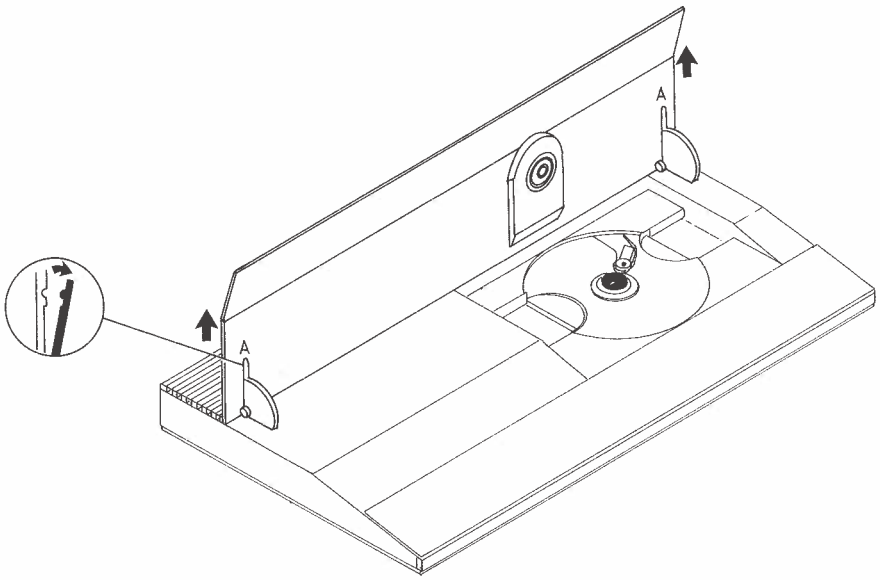
Before carrying out the adjustment, check the angle setting of the laser arm, see page 7.1.

If a check on the angle setting shows that the angle falls outside the tolerance, the angle should *not* be adjusted for minimum deviation but should be adjusted within the tolerance.

After adjusting the angle setting, check the friction of the laser arm. This is done by means of a spring pressure gauge which is held against the magnet of the focusing unit.

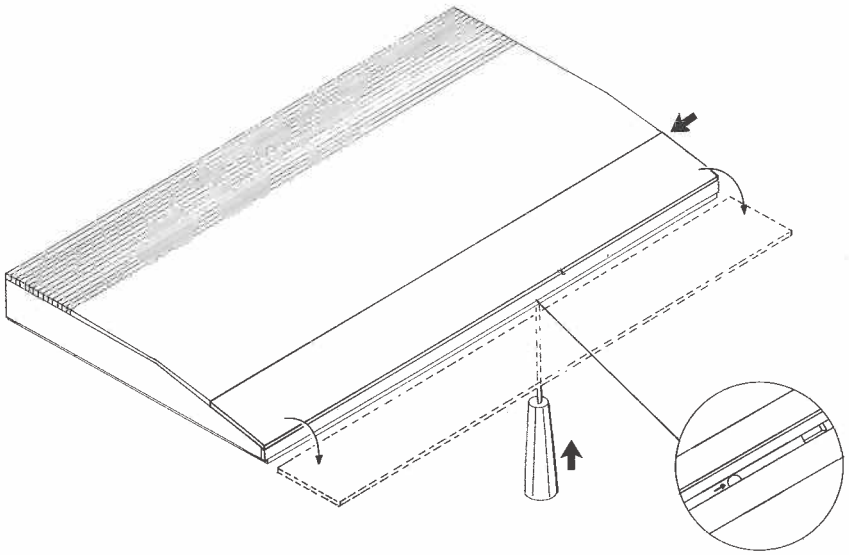
ADSKILLELSE

DISASSEMBLY



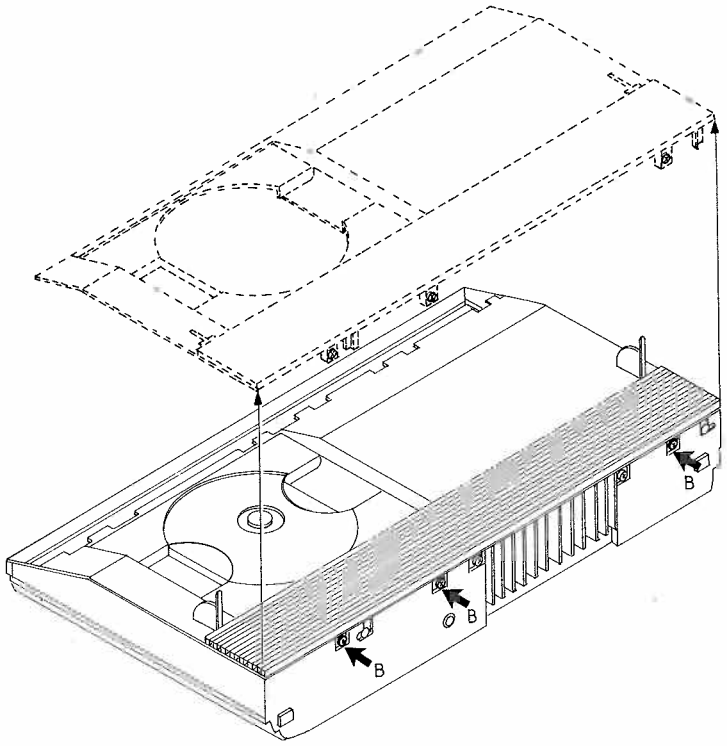
Låg
Lågholderne A i begge sider vippes udad.
Låget kan nu løftes op og fjernes.

Lid
Pull outwards the lid arms A in both sides.
The lid can now be removed by pulling it upwards.



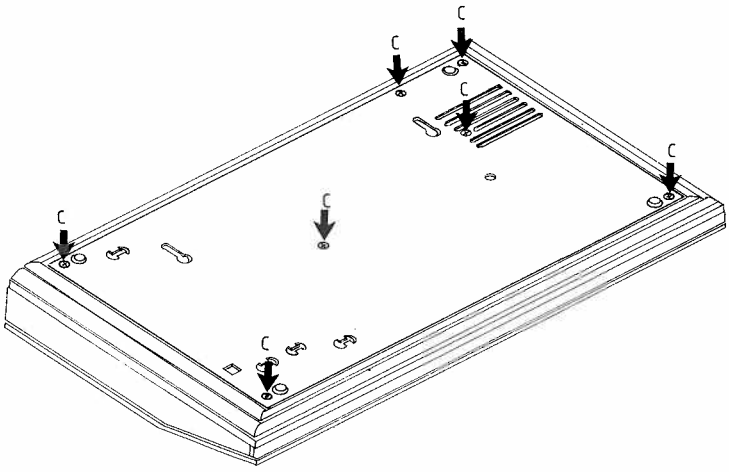
Betjeningspanel
En tynd genstand presses op i hullet mærket med en pil i bunden.
Samtidig presses betjeningspanelet mod venstre.

Operation panel
Insert a thin object in the hole in the bottom marked with an arrow.
At the same time, push the operation panel towards the left.



Topplade
Skruerne B i bagkanten af toppanelet løsnes.
Toppladen kan nu løftes op og fjernes.

Top panel
Loosen the screws B in the rear side of the top panel.
The top panel can now be removed by lifting it.



Bund
Skruerne C i bunden fjernes.
Bunden kan nu aftages.

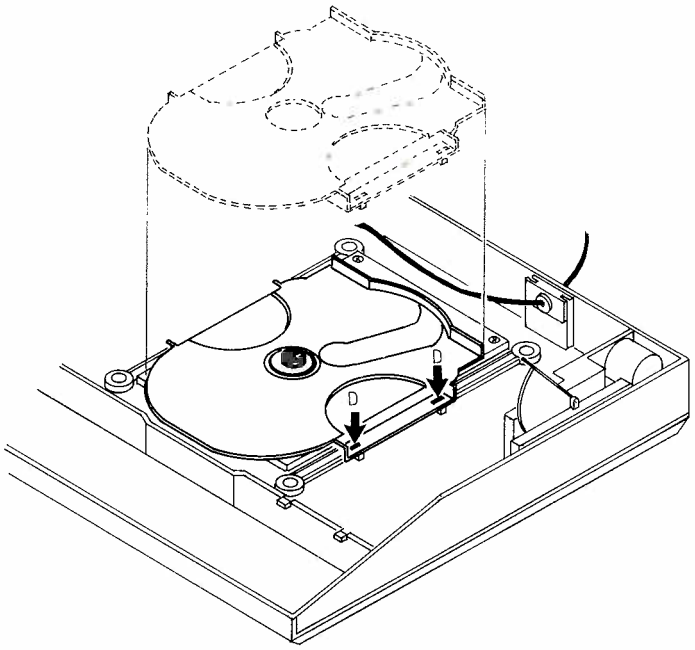
Bottom
Remove the screws C in the bottom.
The bottom can now be removed.

CD løbeværk

Pres de to plastikflige (D) ud, løft samtidig plastdækslet op i samme side.

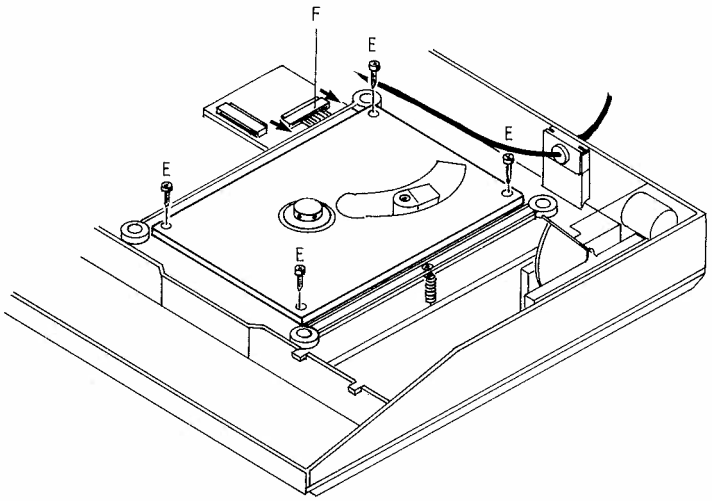
CD Mechanism

Push the two plastic flaps (D) outwards, and lift the plastic cover on the same side simultaneously.



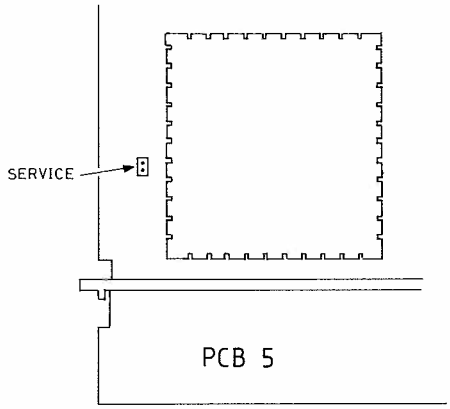
Fjern de fire skruer (E)
Flexprintet i stikket F løsnes.
CD løbeværket kan nu forsigtigt løftes op.

Remove the four screws (E).
Loosen the flexible PCB in the socket F.
The CD drive unit can now be lifted out carefully.



Serviceprogram

Kortslut servicestikket på PCB5, samtidig med at netstikket sættes i. Kortslutningen i servicestikket fjernes.



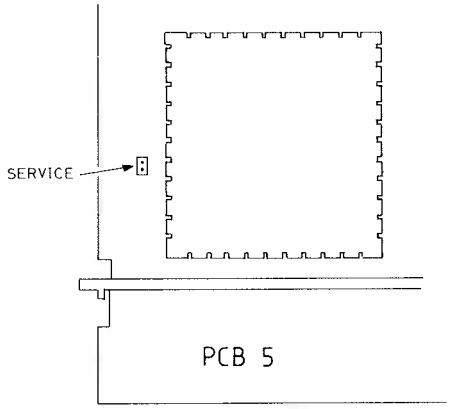
Tast STEP>	Display viser 1 (= serviceposition 1).	
Tast >>	Laserarm svinger ud.	*Hvis arm bliver stående:* Er fleks-PCB rigtigt placeret? Går radialspole imod? Er trægheden i armlejet for stor?
Tast <<	Laserarm svinger ind.	*Hvis arm bliver stående:* Er fleks-PCB rigtig placeret? Går radialspole imod? Er trægheden i armlejet for stor?
Ilæg CD-plade		
Tast STEP>	Display viser 2. Laser tænder og søger focus. Hvis display lyser 2 konstant: Focussøging i orden.	*Hvis 2 i displayet blinker:* CD bliver ved med at søge i focus, indtil der tastes STEP>. Tændes laser? Regulerer FE-udgangen til focus motoramplifier? Regulerer focusmotor?
Tast STEP>	Display viser 3. CD-motor starter rotation og laser placeres mod centrum.	*Hvis CD-plade ikke roterer:* Starter RD-udgangen turntable motoramplifier? Er MCES-pulsen tilstede?
Tast STEP>	Display viser 4. Radialsøgning startes. Hvis display viser 4 konstant. Radial søgning i orden.	*Hvis 4 i displayet blinker:* Regulèrer RE-udgangen til radial motoramplifier? Subcode info er ignoreret. Musik kan høres, fordi MUSB er høj men er afhængig af lead-in sporets længde. Kan vare op til 1 min.

Tast >>	Display viser 4 konstant. Laserarm springer ud over spor.	*Hvis 4 i displayet blinker:* Kontroller radialservo.
Tast <<	Display viser 4 konstant. Laserarm springer ind over spor.	*Hvis 4 i displayet blinker:* Kontroller radialservo.

Serviceprogrammet kan gentages ved at taste STEP>. Displayet viser da kort efter service-position 1.
Serviceprogrammet afsluttes ved kortvarigt at fjerne netstikket.

Service program

Short-circuit the service plug on PCB5 and simultaneously connect the CD player to mains.
Remove the short-circuit on the service plug.



Press STEP>	Display indicates service position 1.	
Press >>	Laser arm swings out.	*If arm doesn't move:* Is flex-PCB placed correctly? Does radial coil touch anything? Is arm bearing inertia excessive?
Press <<	Laser arm swings in.	*If arm doesn't move:* Is flex-PCB placed correctly? Does radial coil touch anything? Is arm bearing inertia excessive?
Load compact disc		
Press STEP>	Display indicates 2. Laser switches on and searches for focus If display indicates 2 constantly. Focus search is OK.	*If 2 in the display flashes:* CD continues to search for focus until STEP> is pressed. Does laser switch on? Does FE output regulate the focus motor amplifier? Does focus motor regulate?

Bang & Olufsen

Beogram CD 3500

Type 5146-5147-5148-5149-5150

3538741

Indklæbes i serviceanvisning nr. 3538721/3538722, Beogram CD 4500 type 51XX.
To paste into Servicemanual no. 3538721/3538722, Beogram CD 4500 type 51XX.
In Serviceanleitung Nr. 3538721/3538722, Beogram CD 4500 Typ 51XX einkleben.
A coller le Manuel d' entretien No. 3538721/3538722, Beogram CD 4500 Type 51XX.

BEOGRAM CD 3500, TYPE 514X

See drawings on pages 4-1

List of Mechanical parts

9006	3114308	Chassis
9019	3162313	Cover
9027	3458710	Top Plate

Bang&Olufsen

CD-Mechanism
Version II
Beogram CD 4500

SERVICE ANVISNING
SERVICE MANUAL
SERVICEANLEITUNG
MANUAL d'ENTRETIE

10-91 3538798

Indklæbes i Serviceanvisningen Beogram CD 4500 (3538721/3538722)
Paste into Service Manual Beogram CD 4500 (3538721/3538722)
In Serviceanleitung Beogram CD 4500 (3538721/3538722) einkleben
A coller le Manual d'entretien pour Beogram CD 4500 (3538721/3538722)

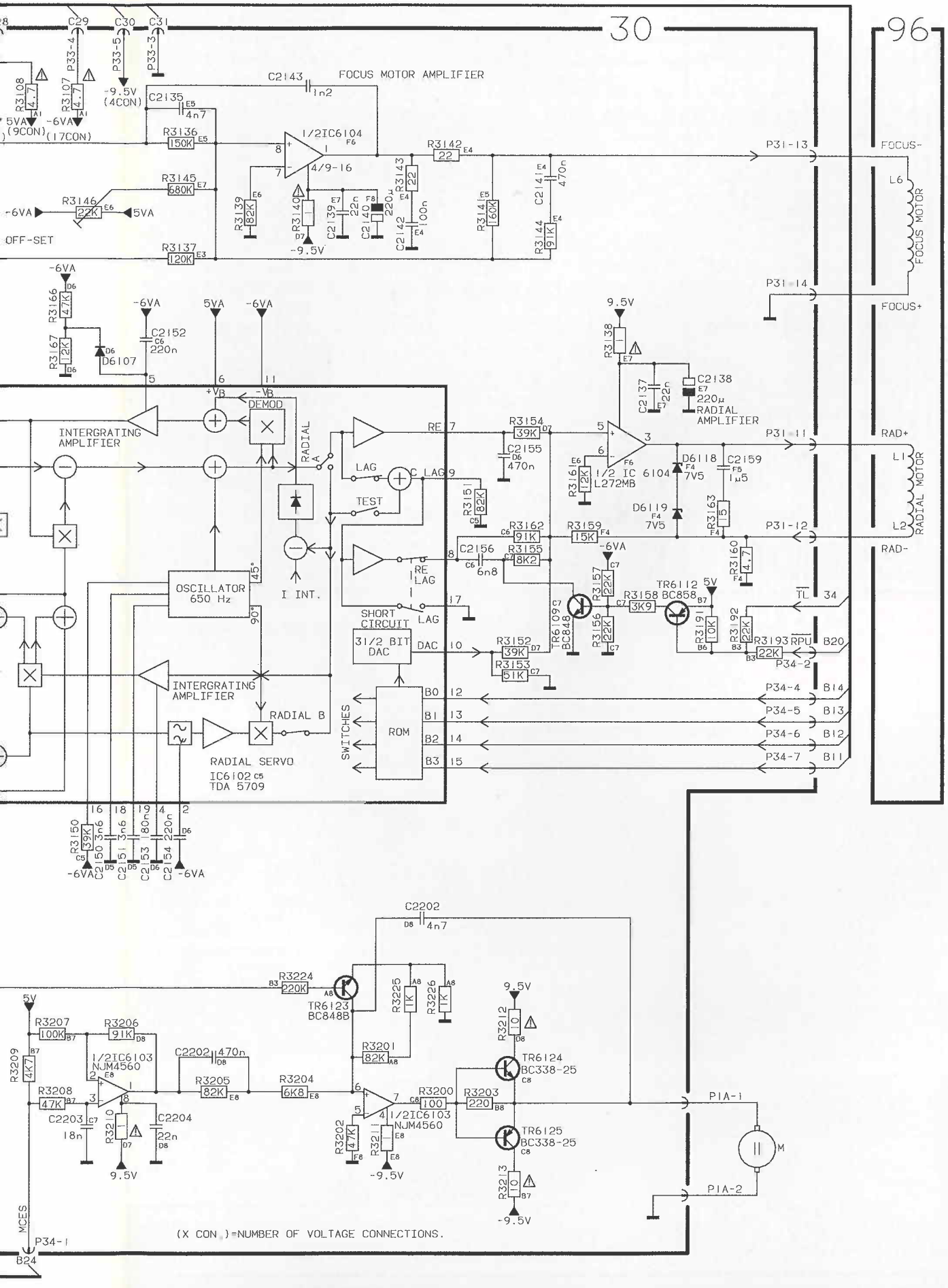
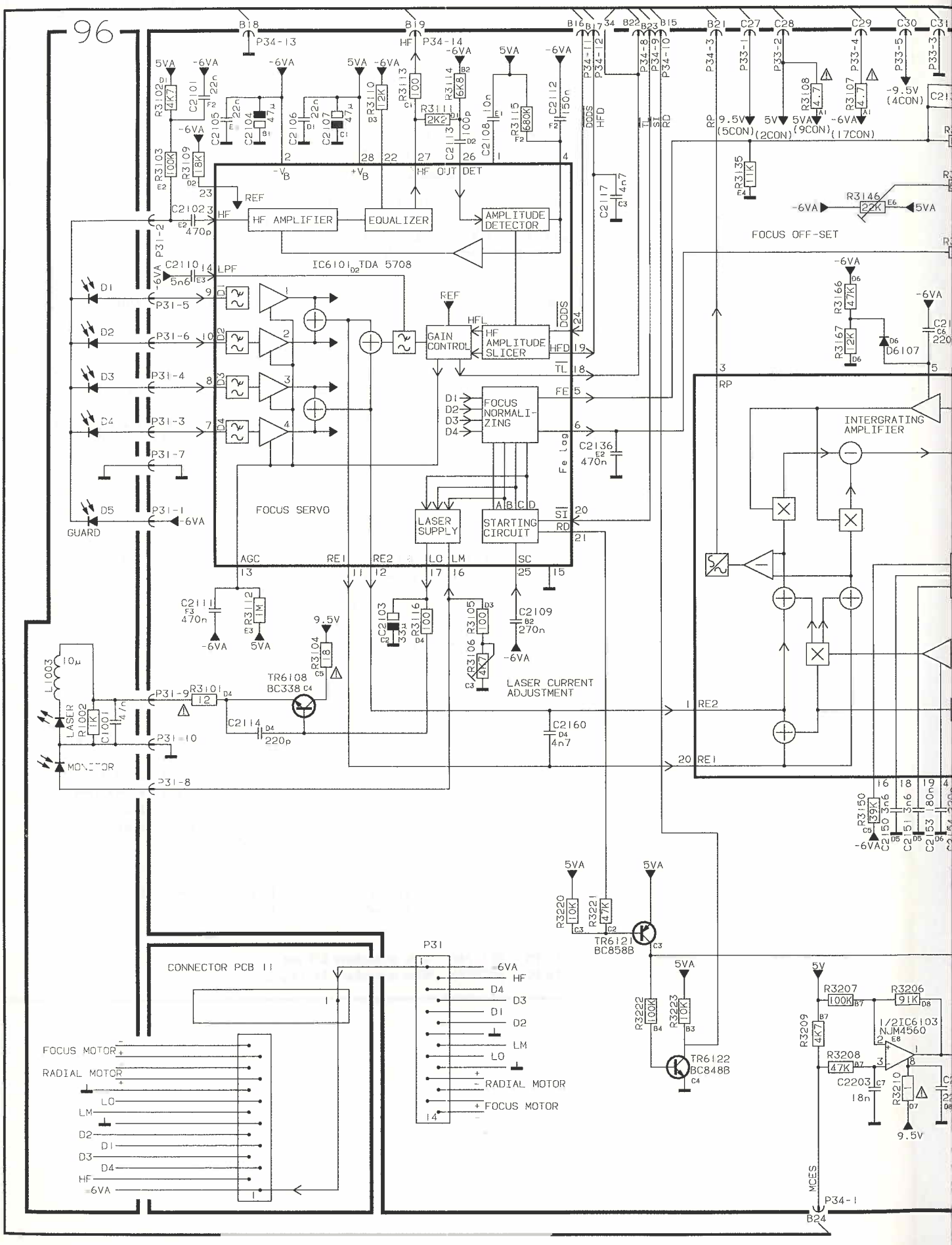
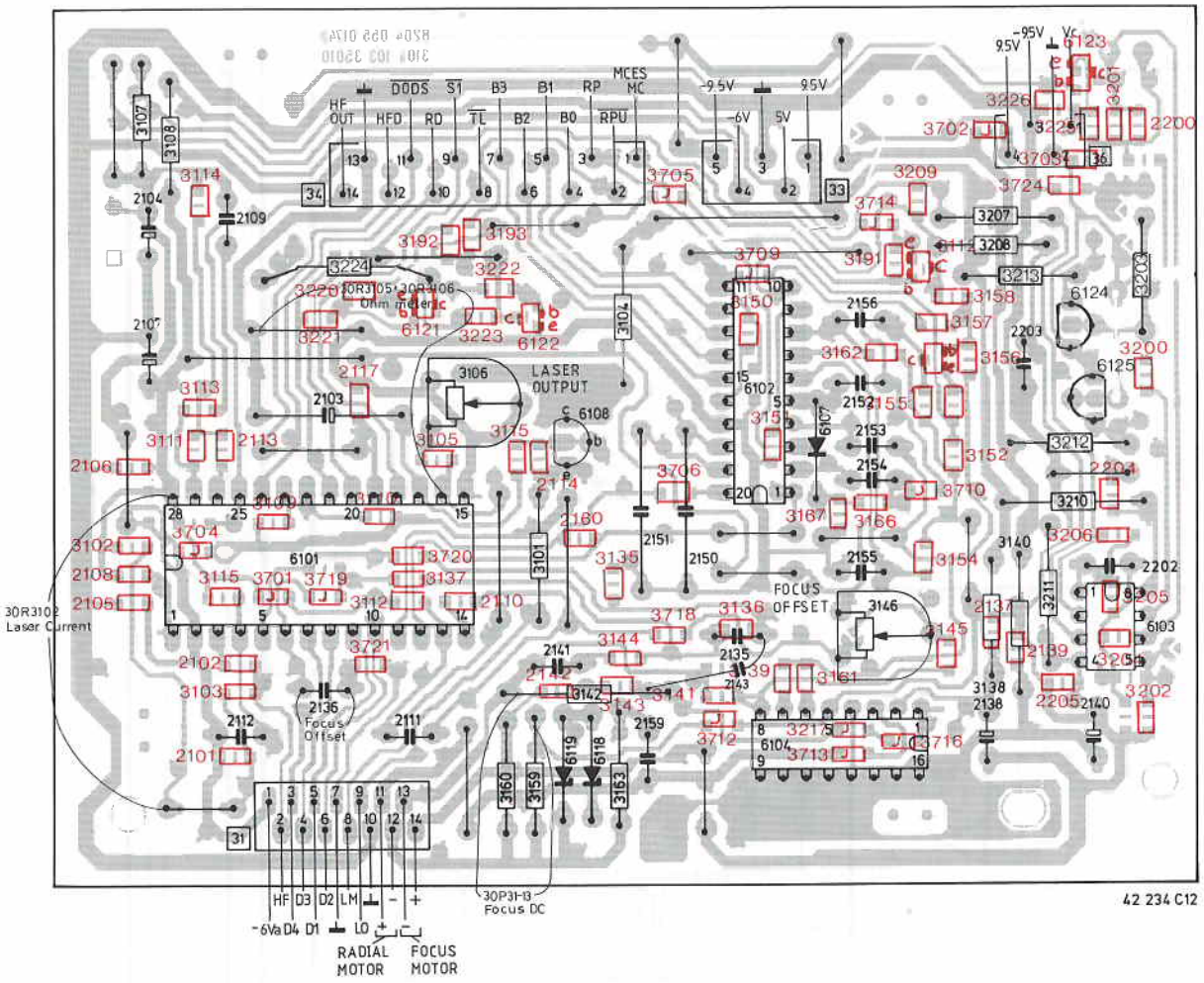

30
96
FOCUS MOTOR AMPLIFIER
C2143 1n2
C2135 4n7
R3136 150K
R3145 680K
R3146 22K
OFF-SET
R3137 120K
1/2IC6104
4/9-16
R3142 22
R3143 22
C2142 100n
C2140 220µ
C2139 22n
R3139 82K
R3140 1
R3141 160K
C2141 470n
R3144 91K
-9.5V
P31-13
FOCUS-
L6
FOCUS MOTOR
P31-14
FOCUS+
-6VA
5VA
9.5V
R3166 47K
R3167 12K
D6107
C2152 220n
R3138 1
C2137 22n
C2138 220µ
RADIAL AMPLIFIER
INTERGRATING AMPLIFIER
DEMOD
RADIAL A
LAG
TEST
RE LAG
SHORT CIRCUIT
31/2 BIT DAC
OSCILLATOR 650 Hz
45°
90°
I INT.
R3154 39K
C2155 470n
R3161 12K
1/2 IC 6104 L272MB
D6118 7V5
C2159 1µ5
D6119 7V5
R3163 15
R3162 91K
R3159 15K
R3155 8K2
C2156 6n8
R3160 4.7
R3157 22K
R3158 BC858
TR6112
TR6109 BC848
R3156 22K
R3191 10K
R3192 22K
R3193 RPU 22K
P34-2
P31-11
RAD+
L1
RADIAL MOTOR
L2
P31-12
RAD-
TL 34
B20
R3152 39K
R3153 51K
P34-4 B14
P34-5 B13
P34-6 B12
P34-7 B11
B0 12
B1 13
B2 14
B3 15
SWITCHES
ROM
INTERGRATING AMPLIFIER
RADIAL B
RADIAL SERVO
IC6102 C5
TDA 5709
R3150 39K
C2150 3n6
C2151 3n6
C2153 180n
C2154 220n
C2202 4n7
R3224 220K
TR6123 BC848B
R3225 1K
R3226 1K
R3201 82K
R3207 100K
R3206 91K
R3209 4K7
1/2IC6103 NJM4560
C2202 470n
R3205 82K
R3204 6K8
R3208 47K
C2203 18n
R3210
C2204 22n
R3200 100
R3203 220
R3202 47K
R3211
1/2IC6103 NJM4560
R3212 10
TR6124 BC338-25
TR6125 BC338-25
R3213 10
PIA-1
PIA-2
M
MCES
P34-1
B24
(X CON)=NUMBER OF VOLTAGE CONNECTIONS.

DIAGRAM A (Servo and Disc Motor System)

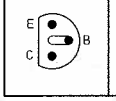
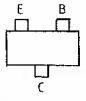
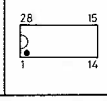


10-1

Servo PCB 30



LIST OF ELECTRICAL PARTS

20	51	103	125	134	209		
							

△ indicates that static electricity may destroy the component.

Resistors not referred to are standard, see page 3-2

PCB 30, 8005288
Servo

IC6101△	8340991	**125**	TDA 5708 C3	IC6103	8340993	**103**	NJM 4560D
IC6102△	8340992	**134**	TDA 5709	IC6104	8340683	**103**	L 272BH
TR6108	8320721	**20**	BC 338-16	TR6122-TR6123	8320615	**51**	BC 848B
TR6109	8320615	**51**	BC 848B				
TR6112	8320616	**51**	BC 858B	TR6125	8320523	**20**	BC 328-25
TR6121	8320616	**51**	BC 858B				
D6107	8300058	**209**	1N 4148	D6118-D6119	8300570	**209**	HZ 7C2 7V5

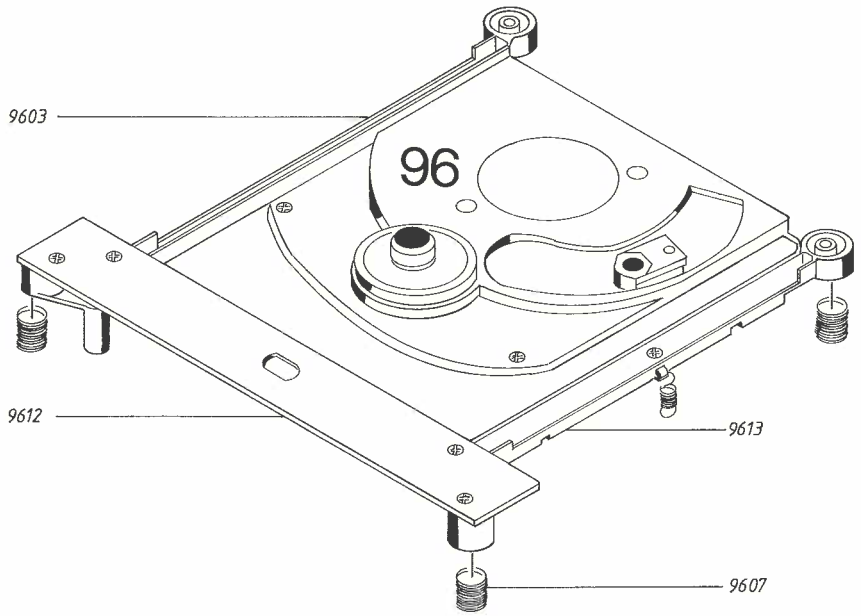
R3101	5020966	12Ω 5% 1/3W	R3146	5370327	22kΩ 20% 0.1W
R3104	5020967	18Ω 5% 1/3W	R3160	5020971	4.7Ω 1% 1/4W
R3106	5370324	4,7kΩ 20% 0.1W	R3207	5020263	100kΩ 1% 1/4W
R3107-R3108	5020965	4.7Ω 2% 1/3W	R3208	5020969	47kΩ 1% 1/4W
			R3210-R3211	5020964	1.0Ω 2% 1/3W
R3138	5020964	1.0Ω 2% 1/3W			
R3140	5020964	1.0Ω 2% 1/3W	R3212-R3213	5020489	10Ω 10% 0,30W
R3141	5011587	160kΩ 1% 1/8W			

C2101	4000255	22nF 10% 50V	C2139	4000255	22nF 10% 50V
C2102	4000249	470pF 5% 50V	C2140	4200745	220µ 16V
C2103	4200414	33µ -10+50% 16V	C2141	4130405	470nF 50V
C2104	4200482	47µ 20% 10V	C2142	4000256	100nF 10% 50V
C2105-C2106	4000255	22nF 10% 50V	C2143	4100283	1.2nF 2% 250V
			C2150-C2151	4130424	3.6nF 1% 160V
C2107	4200482	47µ 20% 10V			
C2108	4000254	10nF 10% 50V	C2152	4130206	220nF 10% 100V
C2109	4130379	270nF 5% 63V	C2153	4130314	180nF 10% 63V
C2110	4000253	5.6nF 10% 50V	C2154	4130206	220nF 10% 100V
C2111	4130405	470nF 10% 50V	C2155	4130405	470nF 10% 50V
C2112	4130406	150nF 5% 50V	C2156	4130338	6.8nF 5% 100V
C2113	4000248	100pF 5% 50V	C2159	4200746	1.5µ 50V Bipolar
C2114	4000233	220pF 5% 50V	C2160	4010173	4.7nF 10% 50V
C2117	4010173	4.7nF 10% 50V	C2200	4010173	4.7nF 10% 50V
C2135	4130370	4.7nF 5%	C2202	4130405	470nF 10% 50V
C2136	4130405	470nF 10% 50V	C2203	4130221	18nF 5% 63V
C2137	4000255	22nF 10% 50V	C2204-C2205	4000255	22nF 10% 50V
C2138	4200745	220µ 16V			

P31	7210614	Socket, 14 pol	P34	7220657	Plug, 14 pole
P33	7220652	Plug, 5 pole	P36	7220651	Plug, 4 pole

To P5	6275746	Wire w/sockets 5/5 pin
To P6	6275745	Wire w/sockets 14/14 pin

LIST OF MECHANICAL PARTS



	8420178	CD Mechanism with servo
	8420179	CD Mechanism without servo
	8005288	Servo PCB

9603	3152841	Holder, left
9612	3342053	Weight load
9613	3152840	Holder, right
9607	2812140	Spring

	6276561	Wire bundle